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(54) **Electrically-driven brush**

Elektrische Zahnbürste

Brosse à dents électrique

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As shown particularly in Fig. 3, the bristles 8a, 8b of each group project through openings formed in wall 4a of the brush head 4. In addition, a spring 22 is interposed between each bristle holder 10a, 10b and the end wall of its respective sleeve 13a, 13b for continuously urging the bristle holders outwardly, but permitting them to move inwardly under pressure.

The arrows in Fig. 4 illustrate the direction of rotation of each of the bristle holders 10a, 10b when rotated by lead screw 16. Thus, the rotation of lead screw 16 in one direction will rotate adjacent in-line bristle holders 10a in opposite directions, and will also rotate each pair of bristle holders 10a on the opposite sides of the lead screw in opposite directions.

As shown in Fig. 4, end wall 4b is constructed as a separable cover plate removably attachable to brush head 4 to cover both groups of bristle holders 10a, 10b. Cover plate 4b fixedly carries a gear 24 located to overlie the central axis of rotary body 12 and to mesh with gears 26 carried by each of the bristle holders 10b. The arrangement is such that the rotation of body 12 will cause bristle holders 10b to rotate with that body about the axis of that body, and also to rotate about their individual rotary axes, as shown by the arrows in Fig. 4.

As also shown in Fig. 4, cover plate 4b is formed on its inner surface with a circular rib 28 circumscribing its fixed gear 24 and aligned with the rotary axes of the bristle holders 10b. Rib 28 engages the outer surfaces of the end walls 13b' of the sleeves 13b receiving the bristle holders 10b to space the inner face of the cover plate 4b slightly from the outer faces of the sleeves, and thereby to reduce the friction during the rotation of the bristles.

The toothbrush illustrated in the drawings operates as follows:

Energization of the electrical motor M (e.g., by a switch suitably located on handle 2, not shown), rotates the lead screw 16. Rotation of the lead screw causes the first group of bristle holders 10a to rotate in the directions of the arrows as illustrated in Fig. 4; the rotatable body 12 carrying the second group of bristle holders 10b will also be rotated, by its ring gear 15 meshing with gear 18 of one of the bristle holders 10a. Rotation of body 12 causes its group of bristle holders 10b also to rotate around the central axis of the body, and the meshing of gears 26 of bristle holders 10b with gear 24 fixed to the cover plate 4b of the brush head, caused each of the bristle holders 10b also to rotate about its respective axis.

While the invention has been described with respect to one preferred embodiment, it will be appreciated that many variations may be made. For example, instead of rotating the bristle holders continuously in one direction about their respective axes, their direction of rotation may be periodically reversed, so that they are actually oscillated about their respective rotary axes. In addition, other transmissions could be used for rotating the bristle holders. Further, the brush could also include a vibrator to vibrate the bristle holders as well as to

rotate them. Many other variations, modifications and applications of the invention will be apparent.

Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the scope of each element identified by way of example by such reference signs.

Claims

1. A toothbrush, comprising: a handle (2) at one end and a brush head (4) fixed to the handle (2) at the opposite end; said brush head (4) including a first group of bristle holders (10b) each rotatable about its respective axis; an electric motor (M) disposed within the handle (2); and transmission means (15, 16, 18, 24, 26) extending from said motor (M) in the handle (2) to said first group of bristle holders (10b) in the brush head (4) for rotating all of the bristle holders (10b) of said first group about their respective rotary axes, characterized in that the rotary axes of said first group of bristle holders (10b) are arranged in a circular array; and in that said circular array of bristle holders (10b) are disposed on a body (12) rotated about an axis centrally of said circular array.
2. The toothbrush according to Claim 1, further characterized in that said brush head (4) also includes a second group of bristle holders (10a) arranged in a linear array and each rotatable about its respective axis.
3. The toothbrush according to either Claim 1 or Claim 2, wherein said rotatable body (12) is formed with a circular array of sockets each rotatably receiving one of said bristle holders (10b) of said circular array.
4. The toothbrush according to one or more of the preceding claims, wherein said transmission means (15, 16, 18, 24, 26) includes a gear (26) carried by each of said bristle holders (10b) of said circular array, and a fixed gear (24) fixed with respect to said brush head (4) centrally of the rotatable body (12) and meshing with said gears (26) of said bristle holders (10b) of said circular array.
5. The toothbrush according to Claim 4, wherein said fixed gear (24) is fixed to a cover plate (4b) removably attached to said brush head (4).
6. The toothbrush according to Claim 5, wherein said cover plate (4b) is formed with a circular rib (28) circumscribing said fixed gear (24) and aligned with said bristle holders (10b) of said circular array.

7. The toothbrush according to one or more of Claims 2-6, wherein said transmission means (15, 16, 18, 24, 26) includes a rotary lead screw (16) coupled to said bristle holders (10a) of said linear array, said bristle holders (10a) of said linear array being disposed in two lines on opposite sides of said lead screw (16) and being formed with threads (14) meshing with the threads of said lead screw (16).
8. The toothbrush according to Claim 8, wherein said lead screw (16) has alternating left-hand and right-hand threads to alternate the directions of rotation of adjacent bristle holders of said linear array.

Patentansprüche

1. Eine Zahnbürste, die folgendes umfaßt: einen Handgriff (2) an einem Ende und einen am Handgriff (2) befestigten Bürstenkopf (4) am entgegengesetzten Ende; wobei der Bürstenkopf (4) eine erste Gruppe von Borstenhaltern (10b) umfaßt, die alle um ihre jeweilige Achse drehbar sind; einen elektrischen Motor (M), der innerhalb des Handgriffs (2) angeordnet ist; und Übertragungsmittel (15, 16, 18, 24, 26), die sich vom Motor (M) im Handgriff (2) zur ersten Gruppe von Borstenhaltern (10b) im Bürstenkopf (4) hin erstrecken, um alle Borstenhalter (10b) der ersten Gruppe um ihre jeweiligen Drehachsen zu drehen, dadurch gekennzeichnet, daß die Drehachsen der ersten Gruppe von Borstenhaltern (10b) in einer kreisförmigen Anordnung angeordnet sind; und dadurch, daß die kreisförmige Anordnung von Borstenhaltern (10b) auf einem Körper (12) angeordnet ist, der um eine Achse in der Mitte der kreisförmigen Anordnung gedreht wird.
2. Die Zahnbürste nach Anspruch 1, weiterhin dadurch gekennzeichnet, daß der Bürstenkopf (4) auch eine zweite Gruppe von Borstenhaltern (10a) umfaßt, die in einer linearen Anordnung angeordnet sind, und wobei alle um ihre jeweilige Achse drehbar sind.
3. Die Zahnbürste nach Anspruch 1 oder 2, worin der drehbare Körper (12) mit einer kreisförmigen Anordnung von Sockeln ausgebildet ist, wobei jeder einen der Borstenhalter (10b) der kreisförmigen Anordnung drehbar aufnimmt.
4. Die Zahnbürste nach einem oder mehreren der vorhergehenden Ansprüche, worin die Übertragungsmittel (15, 16, 18, 24, 26) ein Getriebe (26) umfassen, das von jedem der Borstenhalter (10b) der kreisförmigen Anordnung getragen wird, und ein festes Getriebe (24), das mit Bezug auf den Bürstenkopf (4) in der Mitte des drehbaren Körpers (12) befestigt ist und mit dem Getriebe (26) der Bor-

stenhalter (10b) der kreisförmigen Anordnung im Eingriff steht.

5. Die Zahnbürste nach Anspruch 4, worin das feste Getriebe (24) an einer Abdeckungsplatte (4b) befestigt ist, die abnehmbar am Bürstenkopf (4) angebracht ist.
6. Die Zahnbürste nach Anspruch 5, worin die Abdeckungsplatte (4b) mit einer kreisförmigen Rippe (28) ausgebildet ist, die das feste Getriebe (24) umgibt und mit den Borstenhaltern (10b) der kreisförmigen Anordnung ausgerichtet ist.
7. Die Zahnbürste nach einem oder mehreren der Ansprüche 2-6, worin die Übertragungsmittel (15, 16, 18, 24, 26) eine drehbare Führungsschraube (16) umfassen, die mit den Borstenhaltern (10a) der linearen Anordnung verbunden ist, wobei die Borstenhalter (10a) der linearen Anordnung in zwei Reihen an entgegengesetzten Seiten der Führungsschraube (16) angeordnet und mit Gewinden (14) ausgebildet sind, die mit den Gewinden der Führungsschraube (16) im Eingriff stehen.
8. Die Zahnbürste nach Anspruch 7, worin die Führungsschraube (16) alternierende linksgängige und rechtsgängige Gewinde aufweist, um die Drehrichtungen der angrenzenden Borstenhalter der linearen Anordnung abzuwechseln.

Revendications

1. Brosse à dents, comprenant : un manche (2) à une extrémité et une tête de brossage (4) fixée au manche (2) à l'extrémité opposée ; ladite tête de brossage (4) comportant un premier groupe de supports de soies (10b) chacun apte à tourner autour de son axe respectif ; un moteur électrique (M) disposé à l'intérieur du manche (2) ; et des moyens de transmission (15, 16, 18, 24, 26) s'étendant à partir dudit moteur (M) dans le manche (2) vers ledit premier groupe de supports de soies (10b) dans la tête de brossage (4) pour entraîner en rotation tous les supports de soies (10b) dudit premier groupe autour de leurs axes de rotation respectifs, caractérisée en ce que les axes de rotation dudit premier groupe de supports de soies (10b) sont agencés en une rangée circulaire ; et en ce que ladite rangée circulaire de supports de soies (10b) est disposée sur un corps (12) entraîné en rotation autour d'un axe, de façon centrale, de ladite rangée circulaire.
2. Brosse à dents selon la revendication 1, caractérisée, de plus, en ce que ladite tête de brossage (4) inclut également un second groupe de supports de soies (10a) agencés en une rangée

FIG 3

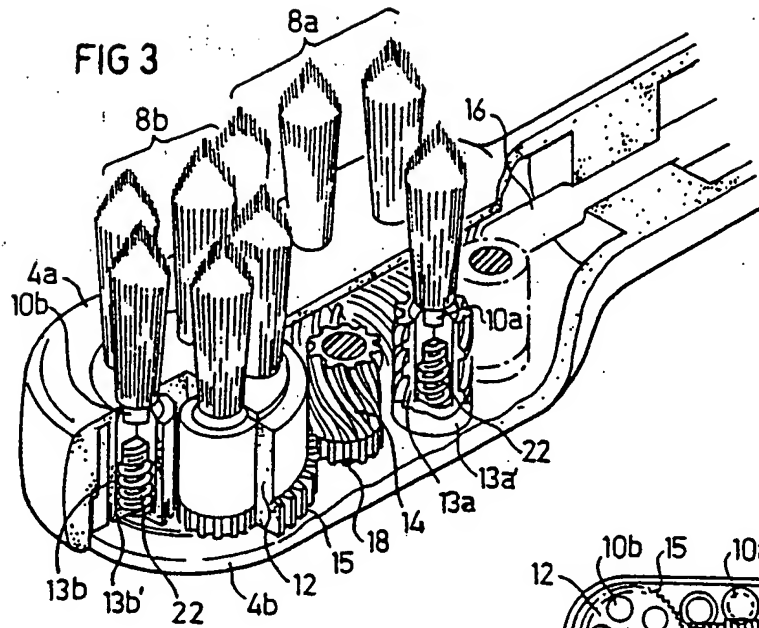


FIG 2

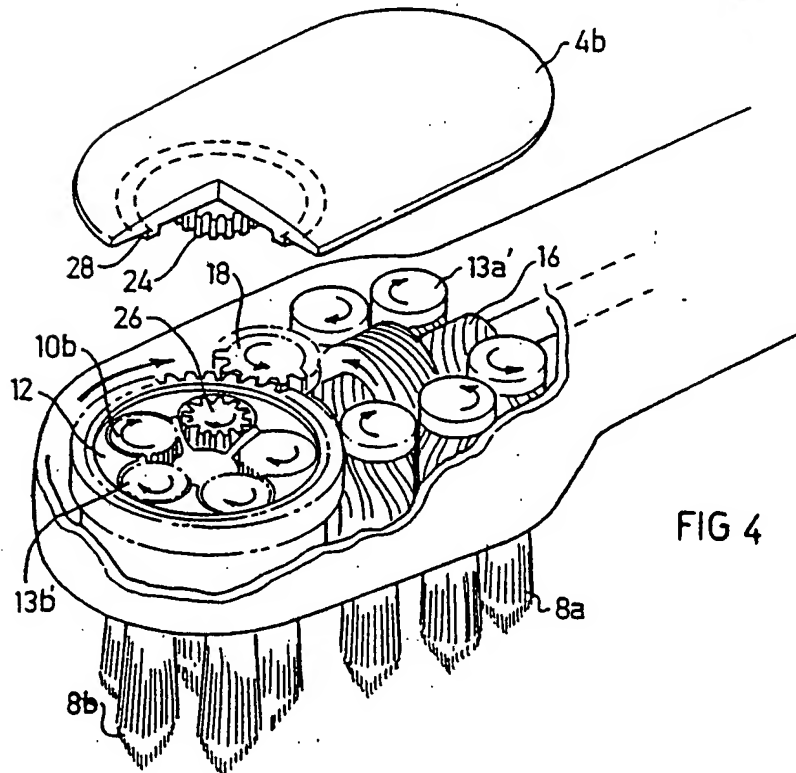
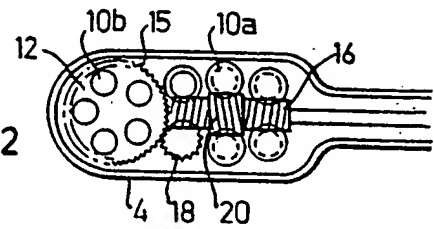


FIG 4